

Synthetic, Kinetic and mechanistic studies on the organo-nanocatalyzed synthesis of Spirooxindole derivatives under ultrasonication and its activity against *raillietina sp* and *syphaciaobvelata*



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Abstract

A new class of organo-nanocatalysts was fabricated by encapsulating magnetic $\text{Fe}_2\text{O}_3@SiO_2$ nanoparticles with thiamine hydrochloride. The prepared catalyst was characterized by various analytical techniques *viz.*, FT-IR, TGA, TEM, SEM, EDX, Powder XRD and VSM and its catalytic activity was investigated for the synthesis of spirooxindole derivatives. Utilizing the ferromagnetic nature of core Fe_2O_3 nanoparticles, the encapsulated catalyst could be easily retrieved from the reaction mixture after completion of the reaction by using an external magnet. The catalyst was reused up to six runs with remarkable catalytic activity. The main advantages of this synthetic approach lie in its operational simplicity, cost effectiveness, higher yields, easy catalyst recyclability and reusability, eco-friendly procedures and shorter reaction times. Mechanistic studies for the organic transformations were also carried out to determine. The catalytic role of thiamine hydrochloride using a computational method *viz.* DFT: B3LYP. Also, the anthelmintic assay of the synthesized spirooxindoles was evaluated against *raillietina sp* and *syphaciaobvelata* and the results showed profound anthelmintic activities.

experience and excellent academic record throughout his studies. He has keen interest in research and a strong potential to learn new things.

Speaker Publications:

1. "Ultrasound-Assisted Synthesis of Nitrogen and Oxygen Containing Heterocycles Using Fluorinated Graphene Oxide as Catalyst: Evaluation of Their Anthelmintic Activities"; *Chemistryselect* / 2020 Vol 5, 2020- Issue 25
2. "l-Glutamine Supported on Core-Shell Silica Iron Oxide Nanoparticles: A Highly Efficient Organocatalyst for Synthesis of Spirooxindoles"; *Chemistry select* / Vol 4 (2019) - Issue 42
3. "Organocatalytic Green Approach Towards the Fabrication of Fused Benzo N , N -containing Heterocycles Facilitated by Ultrasonic Irradiation" / *Journal of Heterocyclic Chemistry* Vol 56, 2019 – Issue 10.

[7th International Conference on Organic and Inorganic Chemistry](#); Webinar – June 18-19, 2020.

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Biography:

Arup Dutta is a bonafide full time research scholar of the Department of Chemistry, NEHU, Shillong, India. He is 25 years old. He has been actively involved in his research activities since the day he joined the Ph. D. Programme in this Department and has Two publication in reputed Journal. He has a strong potential to learn new things and gets along very well with his fellow colleagues. He has two years research